

Portable dehumidifiers as an original matrix for the study of inhalable nanoparticles in school

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Abstract

Good air quality is documented as a significant factor of social justice. The human health hazards associated with air pollution are not distributed equally across cities; the most vulnerable people are more exposed to ambient air as they commute to work and wait for buses or trains at the stations. Aerosols play important roles in atmosphere quality and the climate; their oxidation at the nanoscale level may possibly increase the reactivity and toxicity of atmospheric particulates. Indoor school environments are characterized by high concentrations of different airborne particulate and gaseous pollutants. The documentation of nanoparticles (NPs), ultra-fine particles (UFPs), and micron-size particle species present in indoor primary schools are an important aspect in the recognition of their influence in respiratory difficulties and decreased cognitive progress in children. This work utilizes the study of condensed water, sampled with portable dehumidifiers (PD), to describe NPs and UFPs in the vapor stage of enclosed zones. The acquired extracts were analyzed by advanced electron microscopy techniques. A total of 392 NPs and 251 UFPs were examined in a set of 22 samples acquired in moderately limited or inadequately ventilated indoor areas from several schools. Noting that NPs-related disorders happen at particular places of respiratory structure, identification of site-specific NPs accumulation should be anticipated in direction to better verify the corresponding human health outcomes resulting from respirable NPs.

Keywords

Potential hazardous elements; Carbonaceous matter; Dehumidifier; Cooling load; Indoor schools; Health